

REMARKS

Claims 1-8, 19, 20, 31, 34 and 37-41 are pending in the present application. Claims 9-18, 21-30, 32, 33, 35 and 36 have been canceled by a previous amendment. Claims 1, 19, 20, 39 and 41 are independent. Reconsideration of this application, in view of the following remarks, is respectfully requested.

Examiner Interview

An interview was conducted with the Examiner in charge of the above-identified application on August 17, 2004. Applicants greatly appreciate the courtesy shown by the Examiner during the interview.

In the interview with the Examiner, the Examiner's rejection under 35 U.S.C. § 112, first paragraph was discussed. Specifically, it was explained to the Examiner that the Amendment dated April 22, 2004 presented comments regarding support in the specification for the recitation "without masking or stenciling," which was added by the Amendment dated April 22, 2004. The Examiner reviewed the comments, which appear at page 10, line 7 through page 11, line 14 of the Amendment dated April 22, 2004 and indicated that the comments were sufficient to overcome the rejection under 35 U.S.C. § 112, first paragraph. Applicants greatly appreciate this indication by the Examiner.

Rejection Under 35 U.S.C. § 112

Claims 1-8, 19, 20, 31, 34, 37 and 38 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

As mentioned above, the comments presented by Applicants in the Amendment dated April 22, 2004 at page 10, line 7 through page 11, line 14 address the Examiner's position that there is no support in the specification for the recitation "without masking or stenciling." The Examiner has agreed in the interview of August 17, 2004 that these comments are sufficient to overcome the Examiner's rejection under 35 U.S.C. § 112, first paragraph. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

Rejection Under 35 U.S.C. §103

Claims 1-5, 7, 8, 19, 20, 31, 34 and 37-41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang et al., U.S. Patent No. 6,100,787 in view of Ciardella et al., U.S. Patent No. 5,711,989. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. in view of Ciardella et al., as applied to claims 2 or 3 above and further in view of Itsuji, USPN 5,151,299. These rejections are respectfully traversed.

The present invention is directed to a method of applying viscous medium onto a substrate. Independent claim 1 recites a combination of steps including "add-on jetting of predetermined additional amounts of viscous medium on predetermined positions on the

screen printed substrate, said add-on jetting being performed without masking or stenciling." Independent claims 19, 20, 39 and 41 of the present invention are also directed to a method of applying viscous medium on a substrate. Independent claims 19 and 20 recite the step of "jetting additional viscous medium onto the substrate, said add-on jetting being performed without masking or stenciling." Independent claim 39 of the present invention recites the step of "add-on jetting of individual droplets of viscous medium one drop at a time on predetermined positions on the screen printed substrate." Independent claim 41 recites the step of "add-on jetting of solder paste on predetermined positions on the screen printed substrate." Applicants respectfully submit that the references relied on by the Examiner fail to teach or suggest the presently claimed invention.

With regard to the Huang et al. reference relied on by the Examiner, this reference is directed to a multilayer ceramic package with low-variance embedded resistors. Referring to column 1, lines 11-31 of Huang et al., as mentioned by the Examiner, this reference does disclose that screen printing resistive paste can result in uneven applications of the resistive paste. However, the Examiner also states that Huang et al. "fails to explicitly teach smoothing these coatings" (emphasis added). Applicants submit that there is absolutely no suggestion in the Huang et al. reference, either explicitly or implicitly, that the uneven application of the resistive paste be corrected by "smoothing" the resistive paste as appears to be the position of the Examiner. In Huang et al., the problem of uneven application is not addressed by smoothing the resistive paste, but by completely re-designing the multilayer ceramic package. Specifically, in Huang et al., the problem of

uneven application of the resistive paste is addressed by forming troughs 220 in the sheets 206 and 210 that are filled with the resistive paste during the screen printing process (see column 3, lines 14-16 of Huang et al.). Since the inclusion of the troughs results in a thicker layer of resistive paste, the variation in the application of the resistive paste has less of an effect on the resistance of the embedded resistor. In view of this, Huang et al. solves the problem of uneven application of the resistive paste by making the thickness greater, not by eliminating or smoothing out the unevenness.

The Examiner recognizes that Huang et al. fails to disclose add-on jetting of viscous medium. However, Applicants submit that Huang et al. also fails to disclose solving the problem of uneven application of resistive paste by smoothing the resistive paste. In other words, Huang et al. recognizes the problem, but there is no suggestion that the solution to this problem would be to smooth the resistive paste, and more importantly, to smooth the resistive paste through add-on jetting of additional viscous medium as in the presently claimed invention.

The Examiner relies on the Ciardella et al. reference in order to modify the Huang et al. reference to arrive at the presently claimed invention. Specifically, the Examiner states "Ciardella discloses a nozzle jetting a viscous material in order to form smooth coatings" (emphasis added). Applicants respectfully submit that Ciardella et al. does not disclose or suggest forming smooth coatings as asserted by the Examiner. Ciardella et al. discloses jetting droplets of viscous medium on a substrate, so that the droplets are formed of uniform size. There is no indication that the droplets form smooth coatings. The droplets

are applied at predetermined locations on the circuit board and of predetermined size in order to properly mount a particular component on the circuit board. In view of this, there is absolutely no suggestion in Ciardella et al. to smooth the uneven application of the resistive paste of Huang et al.

Since Ciardella et al. fails to disclose smoothing coatings as suggested by the Examiner, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. In order to establish a *prima facie* case of obviousness, the Examiner must provide some suggestion in the prior art to modify a reference in a particular manner. Since neither of the Huang et al. and Ciardella et al. references suggest smoothing uneven application of resistive paste, and especially smoothing uneven application of resistive paste with a jetting device, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. Therefore, the presently claimed invention is non-obvious over the references relied on by the Examiner.

In summary, the Huang et al. reference relied on by the Examiner discloses screen printing and recognizes that screen printing a substrate can result in uneven application. Ciardella et al. discloses a jetting device. However, there is no suggestion in the Ciardella et al. reference to apply additional viscous medium to a previously screen printed substrate. The Examiner has also not provided any suggestion in the prior art to apply additional viscous medium to a screen printed substrate. The only suggestion to apply additional viscous medium to a screen printed substrate appears in Applicants own disclosure. In

view of this, the Examiner is engaging in impermissible hindsight reconstruction and therefore the Examiner's rejection should be withdrawn.

It should also be noted that the modification proposed by the Examiner would not accomplish a smoothing of the Huang et al. screen printed substrate as asserted by the Examiner. The thickness of the screen printed substrate disclosed in Huang et al. is .3 mils (Huang et al. discloses overcoming resistance problems by increasing this thickness; however, the thickness of a screen printed substrate that is problematic due to unevenness is .3 mils). Huang et al. also discloses that there are variations of up to 30% of this thickness. The Ciardella et al. device could not be used to smooth an uneven application having this thickness. In Ciardella et al., it is mentioned at column 5, lines 31-35 that the dot size is .025 inches. .3 mils is equal to .0003 inches (see column 2, line 59 of Huang et al.). In view of this, the dots of Ciardella et al. are much thicker than the entire thickness of the Huang et al. resistive paste. Therefore, the use of the Ciardella et al. jetting device would not smooth out the resistive layer of Huang et al., but would form large bumps on the surface of the resistive layer. Accordingly, the modification proposed by the Examiner is non-obvious for this additional reason.

With specific regard to independent claims 39 and 41 of the present invention, these claims recite add-on jetting of individual droplets of viscous medium one drop at a time and add-on jetting of solder paste on a previously screen printed substrate. Since the Huang et al. and Ciardella et al. references fail to disclose add-on jetting and Ciardella et al. fails to

suggest using jetting in the Huang et al. device, Applicants submit that claims 39 and 41 are allowable for the same reasons mentioned above.

With regard to dependent claims 2-8, 31, 34, 37, 38 and 40, Applicants respectfully submit that these claims are allowable due to their respective dependence upon allowable independent claims 1 and 39, as well as due to the additional recitations in these claims.

With regard to the Examiner's reliance on the Itsuji reference, this reference fails to disclose add-on jetting being performed without masking or stenciling as recited in independent claims 1, 19 and 20 of the present invention and fails to disclose add-on jetting of individual droplets of viscous medium or add-on jetting of solder paste as respectively recited in independent claims 39 and 41 of the present invention. Accordingly, this reference fails to make up for the deficiencies of Huang et al. and Ciardella et al.

In view of the above amendments and remarks, Applicants respectfully submit that claims 1-8, 19, 20, 31, 34 and 37-41 clearly define the present invention over the references relied on by the Examiner. Accordingly, reconsideration and withdrawal of the Examiner's rejections under 35 U.S.C. § 103 are respectfully requested.

CONCLUSION

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.


It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Paul C. Lewis, Registration No. 43,368 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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